What Is Claimed Is:

1. A method for generating a network, in particular a telecommunications, water, long-distance heat supply, or power network, the network connecting all users (3) to a main distribution node (7) depending on the existing or definable local needs and requirements (4) of the individual users (3),
characterized by the following process steps:

I) Generation of a graph (G) composed of edges (14) and nodes (15), the graph (G) including all technically feasible and/or definable transmission paths (5) of the network, and the length and direction of the edges (14) being derived from the real topography of the street segments and definable cable paths (5) of the territory (1) to be supplied by the network, and the nodes (15) forming the intersections between the edges (14) or streets and/or cable paths (5);

II) Assignment of the users (3) to the graph (G) in such a way that each user (3) is connected to the closest edge (14) or the closest node (15) of the graph (G) by an additional service edge (16).

III) Creation of a tree structure (Ba) by removing unnecessary edges (14) from the graph (G) in such a way that the service edges (16), edges (14), and nodes (15) of the tree structure (Ba) form only one connection between the main distribution node (7) and each user (3).

IV) Determination of the load of the edges (14) in the tree structure (Ba), depending on the needs and

requirements (4) of the users (3).

2. The method as recited in Claim 1, characterized in that a subsequent fifth process step V is used to delimit the areas and to dimension and select the technologies to be used for each edge (14), service edge (16), and node (15) of the tree structure (Ba) on the basis of the loads (21) of the edges (14) calculated in process steps I-IV.

3. The method as recited in Claim 2, characterized in that process step II is used to split the closest edge (14) in the graph (G) into two edges (14a) at the junction between the closest edge (14) and the service edge (16); and the junction forms a new node (15a).

4. The method as recited in one of the preceding claims, characterized in that the tree structure (Ba) can be created as follows in process step III:

a) Determine the user (3) whose transmission path to the main distribution node (7) along the graph (G) is the most economical one of all users (3), marking the located user (3) and the edges (14) and nodes (15) that form the transmission path;

b) Then select the user (3) from the number of as yet unmarked users (3) whose transmission path to the main distribution node is the most economical one, taking into account previously marked edges (14) and nodes (15) of the previously marked transmission paths, marking this user (3), as well as the edges (14) and nodes (15) that form this transmission path;

c) Repeat step b) until all users (3) have been marked;

d) Remove from the graph (G) all unmarked edges (14) and nodes (15) in the graph (G).

5. The method as recited in one of the preceding claims, characterized in that the data of the real topography of the street segments and definable cable paths (5) in the territory (1) to be supplied by the network is stored in a first database, and the data of the users (3) is stored in a second database, and the second database stores, among other things, the address, junction coordinates and requirements (4) to be covered by the network for each user (3).

6. The method as recited in Claim 5, characterized in that the graph (G), followed by the tree structure (Ba), is generated from the data in both databases.

7. Method for generating and optimizing a network, in particular a telecommunications network, according to one of the preceding claims, characterized in that each street in the territory can be depicted in process step I by two, in particular, parallel edges (14) during generation of the graph (G), each edge (14) representing one side of a street.

8. The method as recited in Claim 7, characterized in that the users (3) can be connected to the exchange (7) by transmission lines of different types, such as copper lines or copper pairs (CuDA) or glass fibers, and the transmission lines are distinguished from one another by their transmission capacities and maximum ranges, the

cables having different numbers of copper pairs (CuDA) or glass fibers being provided for this purpose, and multiple users (3) being supplied by a cable (VzK) in such a way that the number of telephone and/or data transmission lines needed for one user (3) can be run out from a cable (VzK) passing by one user (3) and leading to another user (3).

9. The method as recited in Claim 7 or 8, characterized in that process step V is divided into the following steps:

a) Define the cable distributor capacity and/or the range of the transmission equipment to be used for the cable distribution area, the capacity being derived, in particular, from the equipment to be used for the cable distributors;

b) Go to a user (22) whose service edge (16) is connected to a node (15) which is connected to only one further edge (14);

c) Starting at the user (3) selected in step b), follow the service edges (16), edges (14), and nodes (15) of the tree structure (Ba) in the direction of the exchange (7) until reaching an edge, referred to below as a limit edge (Gk), which borders a node (15) that is connected to an edge (25) whose load (21) exceeds the capacity and/or the range of the cable distributor or cable distribution area defined in step a);

d) Mark all users (3) that are connected to the exchange (7) by the limit edge (Gk) and assign them

to a cable distribution sub-area (23);

e) Repeat steps b) through d) until all users (3) have been assigned to cable distribution subareas (23).

10. The method as recited in Claim 9, characterized in that process step e) is followed by a process step in which a recursive method is used to combine all cable distribution sub-areas (23) into cable distribution areas (26) so that the load (30) of each cable distribution area (26) does not exceed the capacity of the cable distributor defined in step a); each user (3) is assigned to only one cable distribution area (26).

11. The method as recited a in one of the preceding claims, characterized in that the number of cable distribution areas (26) is minimized in process step f).

12. The method as recited in Claim 9 or 10, characterized in that only those cable distribution subareas (23) which are directly adjacent to each other are combined into cable distribution areas (26).

13. The method as recited in one of Claims 10 through 12, characterized in that process step e) is followed by the following process steps:

f) First search the tree structure (Ba) for all cable distribution sub-areas (23) whose load, combined with the load of a directly adjacent cable distribution sub-area (23) which has a smaller or equal load and whose limit edge (Gk) borders on the same node (28), is greater than the capacity derived

in process step a) of the cable distributor;

g) Combine any cable distribution sub-areas (23) of this type located in the tree structure (Ba) into cable distribution areas (26), except for the smallest cable distribution sub-area (23), and carry out process steps h) and i) for the cable distribution area (26);

h) Remove the cable distribution areas (26) formed in process step g) from the tree structure (Ba) and ignore them while generating the remaining cable distribution areas (26) so that all users (3), service edges (16), edges (14), and nodes (15) connected to the exchange (7) by the limit edge (Gk) are separated from the tree structure (Ba) or are ignored when generating the remaining cable distribution areas (26); and subtract the load (30) of the separated cable distribution areas (27) from the assigned load (21) of all edges (14) connecting them to the exchange (7);

i) Then check whether any other limit edges (Gk) of additional cable distribution sub-areas (23) border on the node (15) that connected the separated cable distribution area (27) to the exchange (7); if no additional limit edges (Gk) are present, remove the connecting node (28) as well as the edges (14) and nodes (15) which connect it to the next node (29) on which a further limit edge (Gk) borders.

14. The method as recited in Claim 13, characterized in that additional cable distribution areas (26) can be created

using the following process steps:

j) Look for the node (28) that is connected to only one edge (14) and at least one limit edge (Gk), the load (21) of the edge (14) being higher than all other edges (14) still existing or to be included in the tree structure (Ba);

k) If the sum of the loads of all cable distribution sub-areas (23) adjacent to the located node (28) is less than or equal to the capacity of the cable distributor, combine all of these cable distribution sub-areas (23) into a new cable distribution sub-area (23) whose load is equal to the sum of the individual loads of the combined cable distribution sub-areas (23); then go on to step 1);
If the sum of the loads of all cable distribution sub-areas (23) adjacent to the located node (28) is greater than the capacity of the cable distributor, combine those adjacent cable distribution sub-areas (23) whose total individual loads are the highest, yet lower than the capacity of the cable distributor, thus forming a new cable distribution area (26);
Remove this cable distribution sub-area (23) or the new cable distribution area (26) from the tree structure (Ba), or ignore it when creating cable distribution areas (26); then subtract the load (31) of the eliminated cable distribution area (27) from the assigned load (21) of all edges (14) connecting this cable distribution area (26) to the exchange (7); if any cable distribution sub-areas (23) are still attached to the tree structure (Ba), go to

step f); if not, go to step p);

1) The edge (14) connecting the located node to the exchange (7) is the limit edge (Gk) of the new cable distribution sub-area (23);

m) If this limit edge (Gk) is adjacent to a node (15) on which no further limit edges (Gk) border, look for the next node (29) on which another limit edge (Gk) borders, starting from the limit edge (Gk) and moving toward the exchange (7);

n) If no nodes (29) of this type can be found in step m), the cable distribution sub-area (23) becomes a cable distribution area (26); in this case, go to step p); if a node (29) of this type was found, proceed to step o) to continue applying the method;

o) Connect the limit edge (Gk) of the cable distribution sub-area (23) to the node (29) located in step m); repeat steps f) through n) until step n) branches to step p);

p) This completes the process of creating the cable distribution areas (26).

15. The method as recited in one of Claims 10 through 14, characterized in that the following process steps are carried out after the procedure for creating the cable distribution areas is completed:

q) Determine the distribution center of each cable distribution area in relation to the location and

requirements of each user assigned to the cable distribution area, a node of the cable distribution area forming the distribution center and simultaneously the junction between the cable distribution area and the telecommunications network to be generated;

r) Assign the load of the cable distribution area to each distribution center;

s) Create a new tree structure, marking all nodes and edges of the original tree structure produced in process step III which connect the distribution centers defined as nodes to the exchange (7), and then remove all unmarked users, service edges, nodes and edges from the tree structure or ignore them when performing the subsequent process steps.

16. The method as recited in one of the preceding claims, characterized in that all users (3) whose requirements (4) are greater than the cable distributor capacity set in step Va) are each defined as one cable distribution area (26) prior to completing process step Vf), these users each being assigned enough transmission equipment to cover the requirements of that specific user, so that the node (15) on which the limit edge (Gk) of a user (3) of this type borders is assigned a requirement for the new tree structure (Ba) to be created in process step Vs) which is a multiple of the capacity defined in step Va), thus just covering the requirements of this user, subsequently removing this user (3) from the tree structure (Ba), the node forming the distribution center or location of the cable distributor assigned to the user

(3).

17. Method for determining the load of the edges (14) in the tree structure (Ba) (process step IV) according to one of the preceding claims, characterized in that a load of "O" (zero) is initially assigned to all edges (14) of the tree structure (Ba), and moving from one user (3) to the next along the edges (14) and nodes (15) in the direction of the exchange (7), the requirements (4) of each user is added to each edge (14) traveled.

18. The method for dimensioning the transmission equipment and cables for the cable distribution areas (26) formed in process step V as recited in one of the preceding claims, characterized in that the following process steps are completed consecutively:

u) Assign a load of "O" (zero) to all edges (14) in the tree structure (Ba);

v) Moving from each user (3) along the edges (14) and nodes (15) to the cable distributor of the cable distribution area (26) belonging to the user (3), add the requirements (4) of the user to each edge (14) traveled;

w) Assign to each edge (14) a cable whose capacity just covers the load of the particular edge (14);

x) Assign to each node (15) a piece of transmission equipment which covers the load of that particular node (15).

19. The method as recited in Claim 18, characterized in that process steps IV and Va) to Vs) and steps u) to x) are applied to the new tree structure (33) following process step Vs), defining a different capacity and range for the new cable distribution areas (26) to be created on the new tree level in step Va).

20. Application of a method according to one of the preceding claims using a data processing program.

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